

WHAT IS CLAIMED IS:

1. Method for non-adhesive bonding of two contiguous plastic work pieces (2, 3; 5, 6),
characterized in that
 - the intended contact surface (K) of at least one of the two work pieces (2, 5 or
5 3, 6) by which it borders on the other work piece (3, 6 or 2, 5) is at least in
some sections subjected to a high-energy radiation which causes the lowering
of the glass transition temperature in a marginal layer (R, R'),
 - the two work pieces (2, 3; 5, 6) are brought into a mutual position according
to the intended use, and
 - 10 — subsequently, to produce the bond of the two work pieces (2, 3; 5, 6) at least
the modified marginal layer (R, R') in the area of its surface is heated to a
temperature which is above the glass transition temperature of the marginal
layer (R, R') modified by radiation, but below that of the unmodified areas of
the respective work piece (2, 3; 5, 6).
- 15 2. Method according to Claim 1, **characterized in that** the entire contact surface (K) is
subjected to the high-energy radiation process.
- 20 3. Method according to Claim 1 or 2, **characterized in that** the step of heating is
performed while the two work pieces (2, 3; 5, 6) are under pressure in relation to each
other.
- 25 4. Method according to one of Claims 1 to 3, **characterized in that** the two work pieces
(2, 3; 5, 6) brought into a mutual position according to their intended use are heated to
accomplish the bond.
- 30 5. Method according to one of Claims 1 to 4, **characterized in that** the contact surfaces
of the two work pieces (2, 3) are radiated with high-energy radiation for the formation
of a modified marginal layer (R, R') on each.

6. Article (1, 4) formed of two work pieces (2, 3; 5, 6) non-adhesively bonded together, produced according to one of the above Claims, **characterized in that** in at least one contact surface (K) of the two work pieces (2, 5), recesses (V), in particular channel-like recesses, are provided.

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7. Article according to Claim 6, **characterized in that** the recesses (V) are formed as microstructures and/or nanostructures.

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8. Article according to Claim 6 or 7, **characterized in that** at least one of the two work pieces (6) is provided with electrodes (E), in particular with structured thin-film electrodes, on its contact surface.

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9. Article according to Claim 8, **characterized in that** the electrodes (E) on the contact surface and the channel-like recesses (V) are assigned to the other work piece (5), and that the electrodes in at least some sections form a wall of a closed recess (V) after the two work pieces (5, 6) are bonded.

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10. Article according to one of Claims 6 to 8, **characterized in that** at least one of the two work pieces is designed as a microstructured and/or nanostructured filter.

11. Application of an article according to one of Claims 6 to 10, **characterized in that** at this article is used as a microanalysis unit or a microreactor unit.